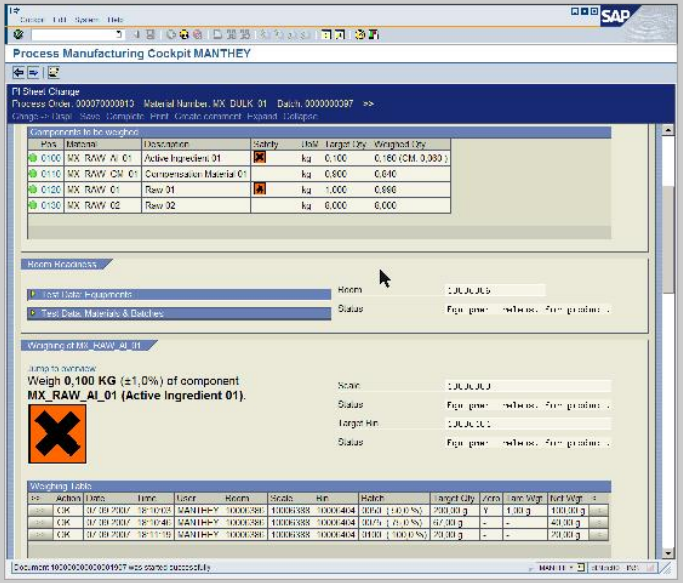
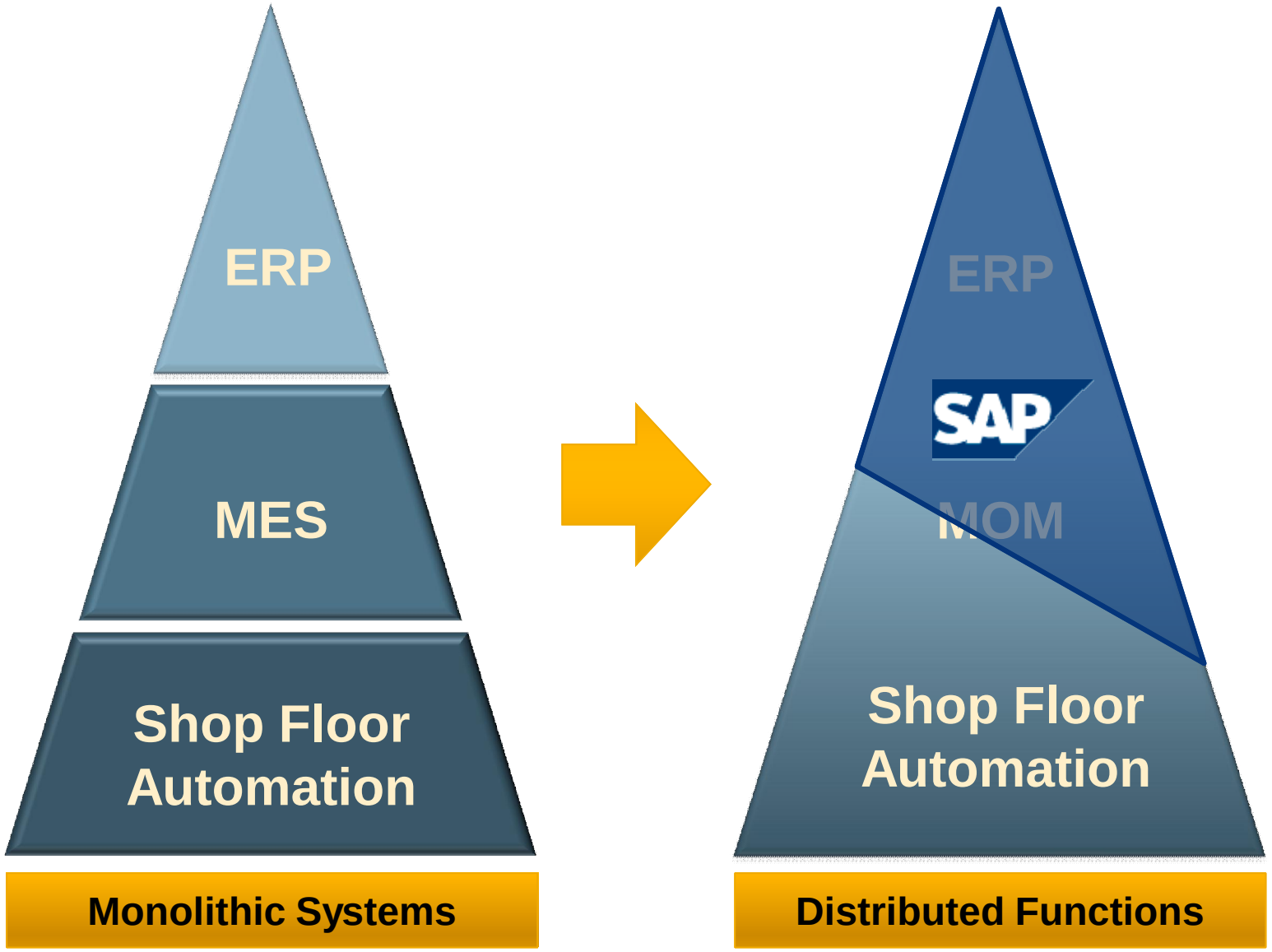
Core Manufacturing

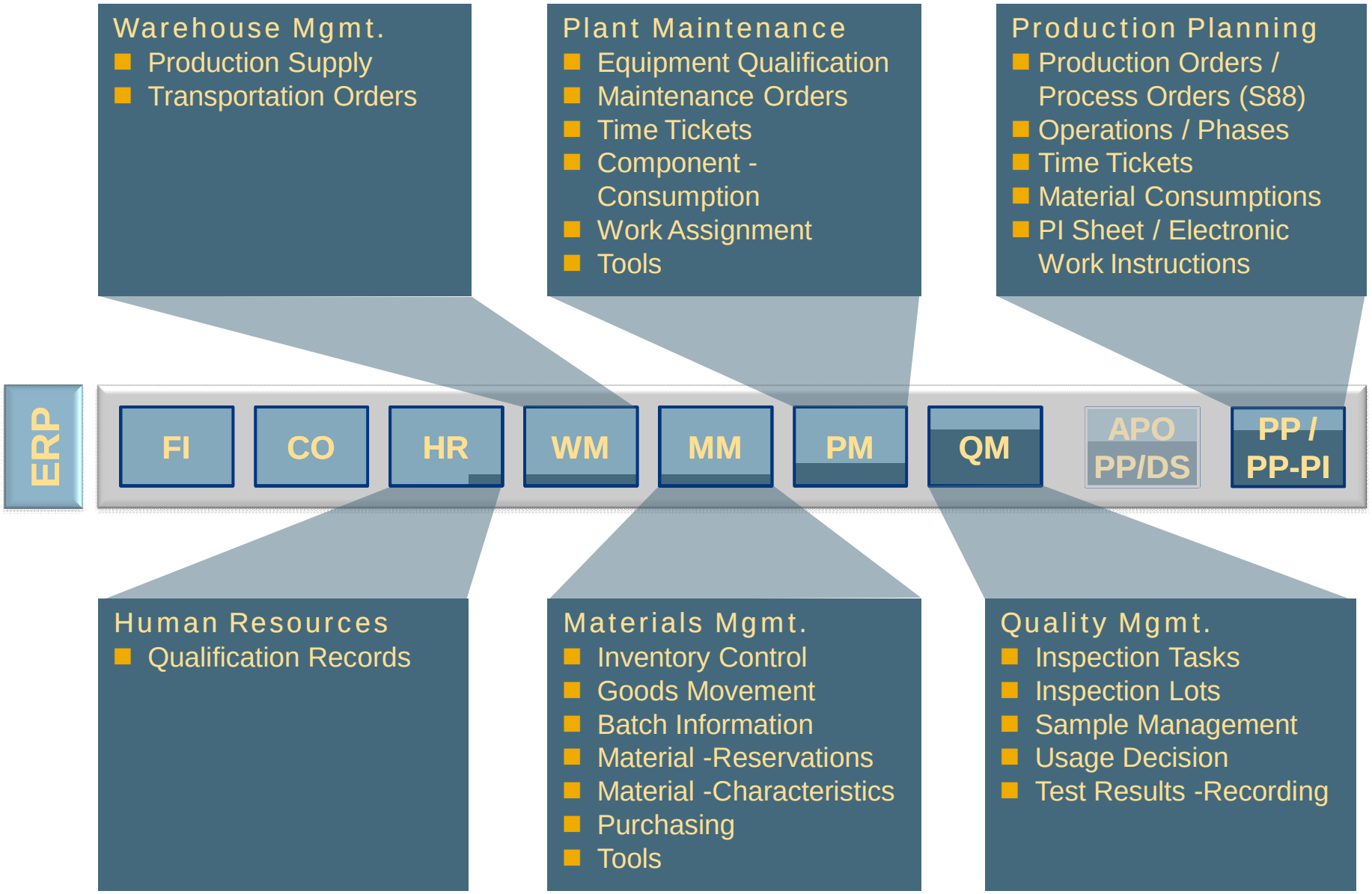


Arne Manthey
SAP AG
06/2010

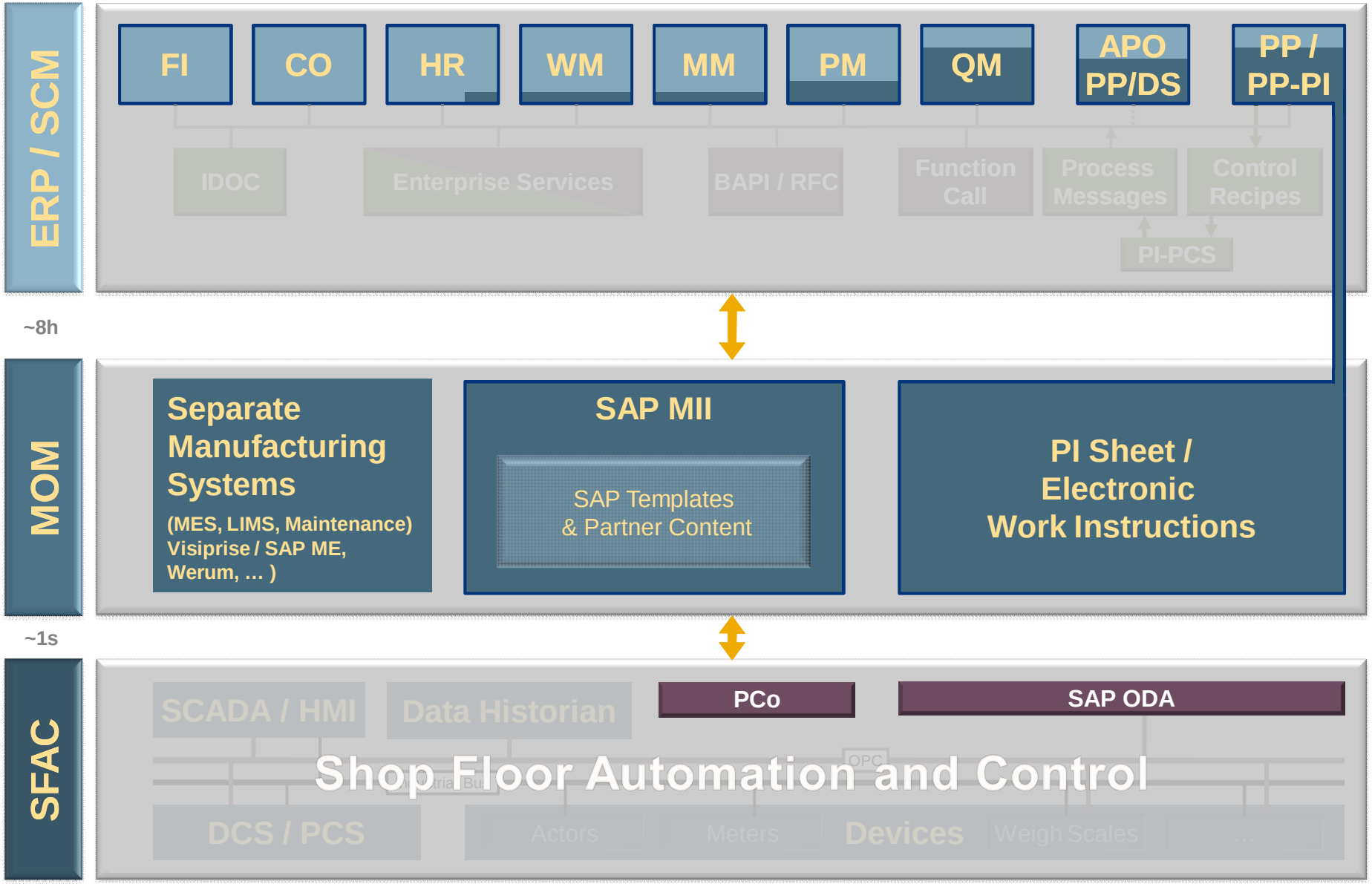
System Borders blur...



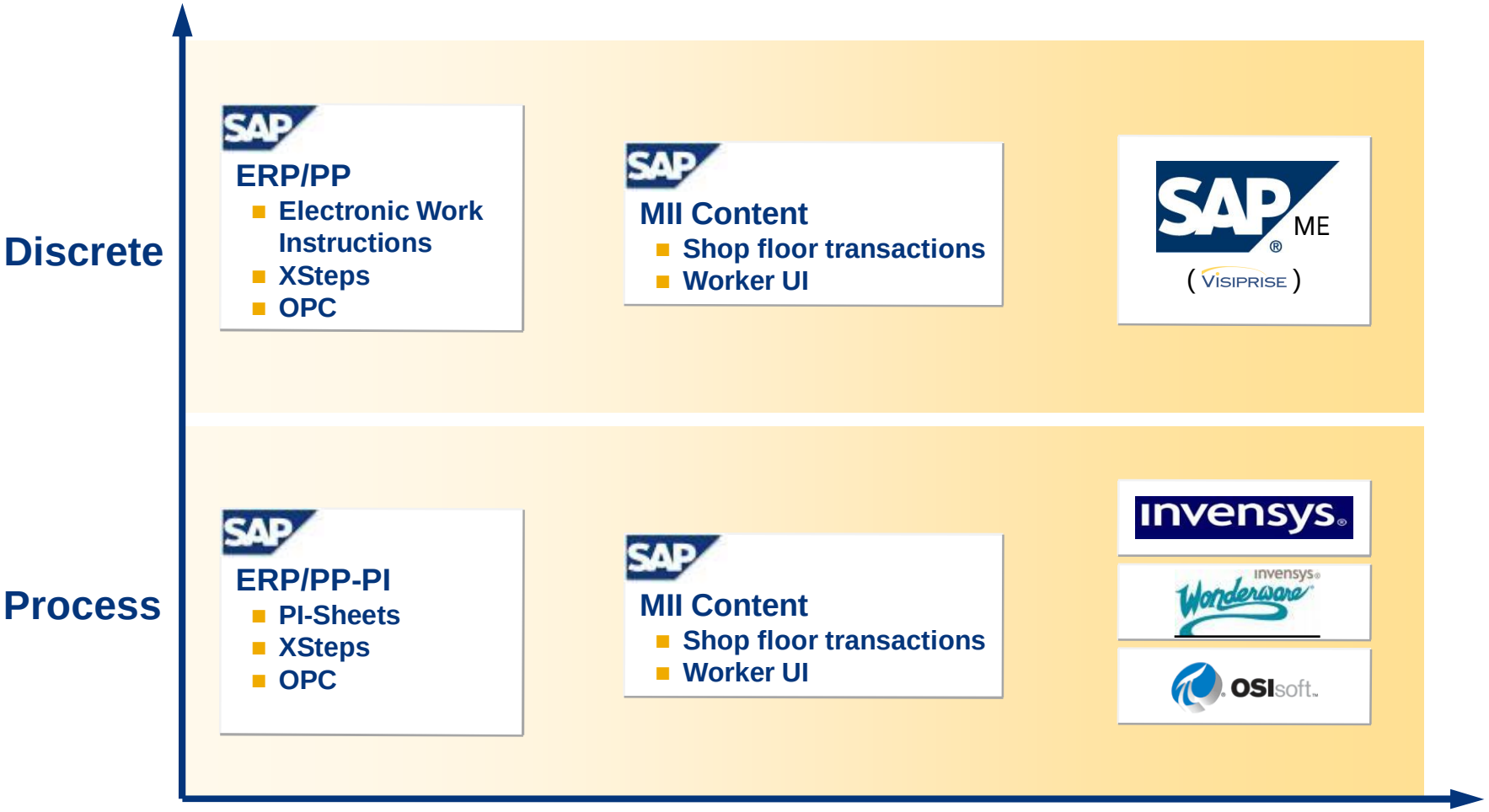
SAP ERP Touchpoint Processes with Manufacturing



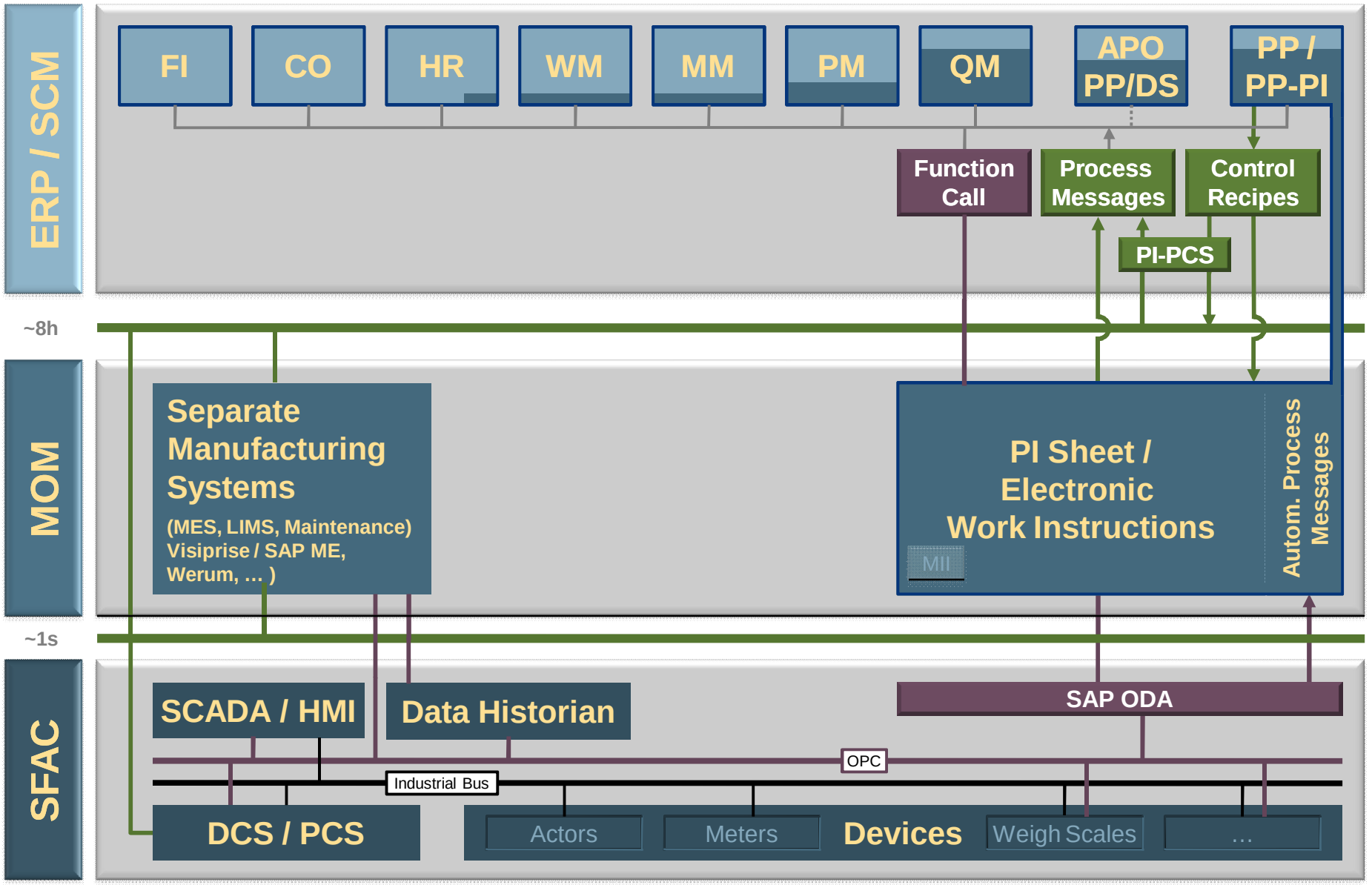
Manufacturing Levels and Landscape



SAP Solutions for Manufacturing Execution



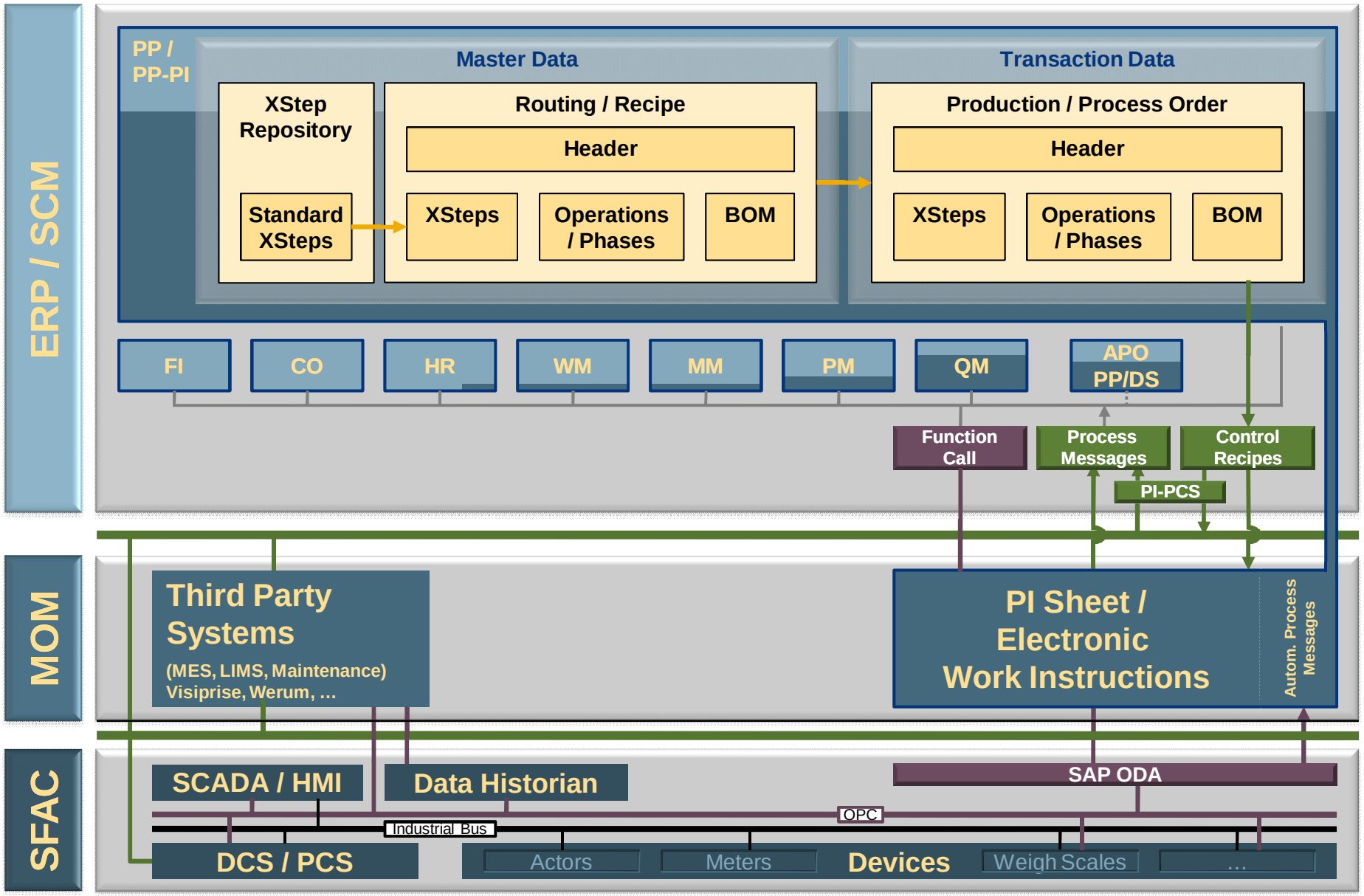
Manufacturing Levels and Landscape
Using ERP Manufacturing only



Synchronous Data Transfer

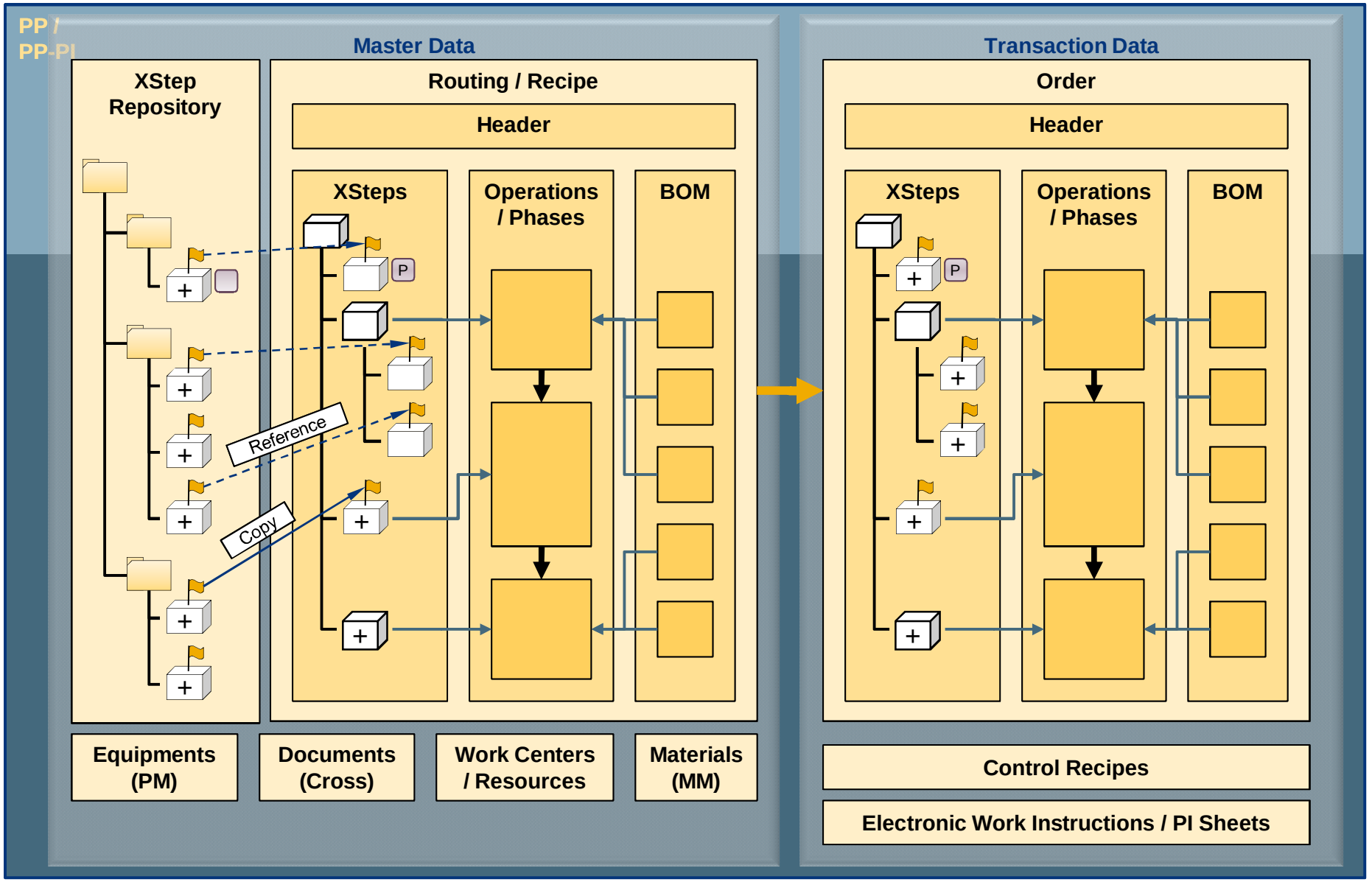
Asynchronous Data Transfer

Manufacturing Levels and Landscape
PP / PP-PI



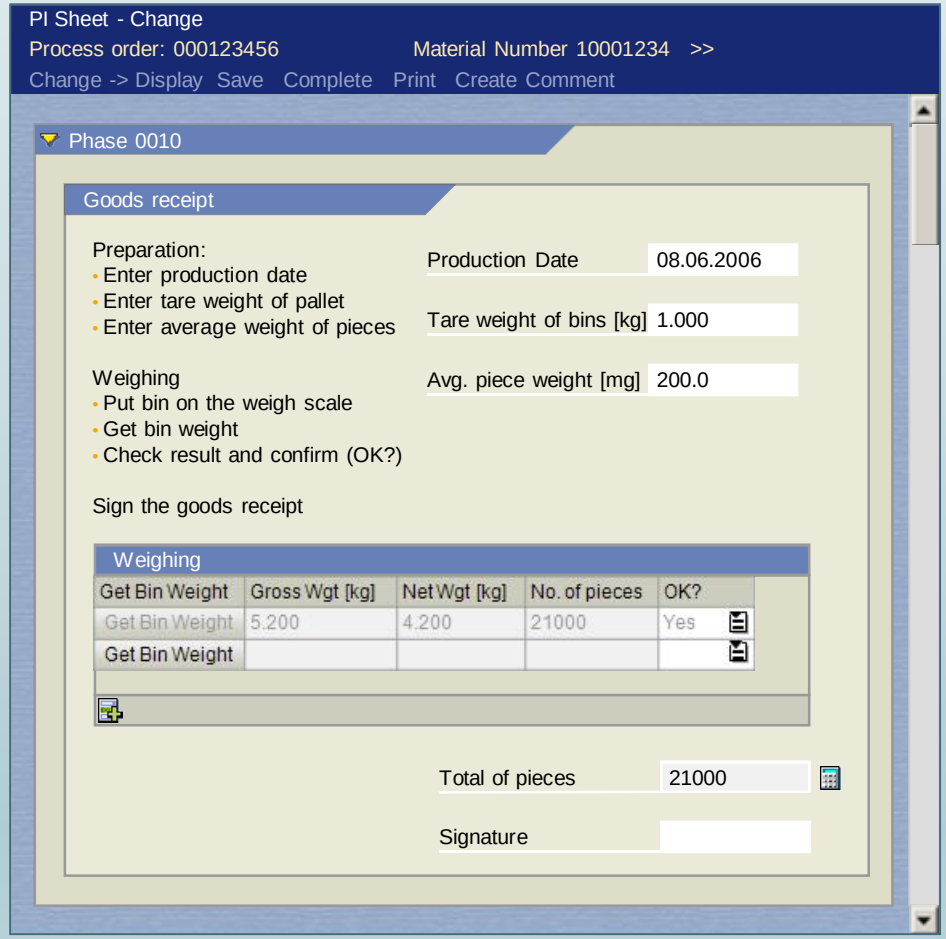
Synchronous Data Transfer Asynchronous Data Transfer

PP / PP-PI:
XSteps, Master and Transaction Data



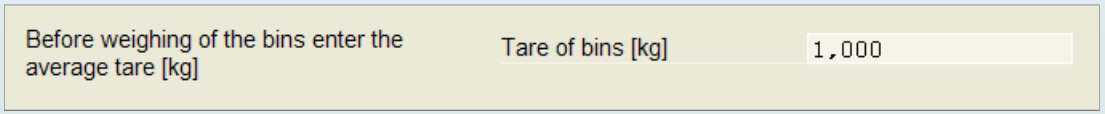
Features of the PI Sheet / Electronic Work Instruction (I)

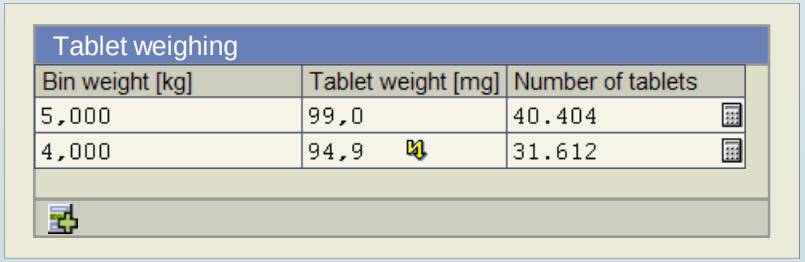
- Header with order information
- Containers for Operations / Phases (can be collapsed)
- Instruction containers for convenient structuring
- Long text elements are on the left side
- Short text and input elements are on the right side
- Tables stretch over the whole width
  - Repeated data input (extendable with new lines)
  - Grouped elements with similar structure (e.g. check lists, generated material lists, …)
- Scrollable
- Input history can be logged
- Comments can be entered at any time

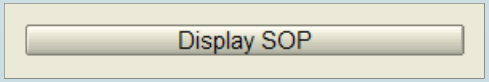


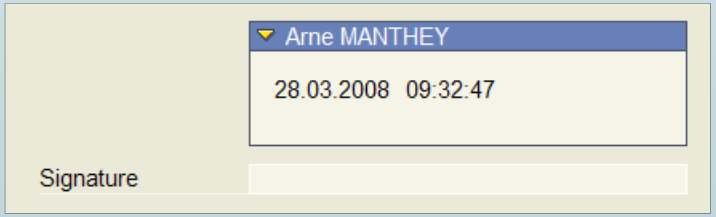
Features of the PI Sheet / Electronic Work Instruction (II)

- Output of text instructions
- In- and output of values
  - Default values, value validation
- Tables
- Calculations
- Function calls
- OPC data access
  (e.g. read measurement from device)
- Digital signature (simple, multiple)
- Automatic generation of order-related object
  (e.g. documents, components,…)
- Event-triggered execution of commands and functions
  - Automatic execution of functions (e.g. immediate check of material status)
  - Activation/deactivation of instructions based on conditions
- Process messages
  (Activity reporting, material consumption/production,…)

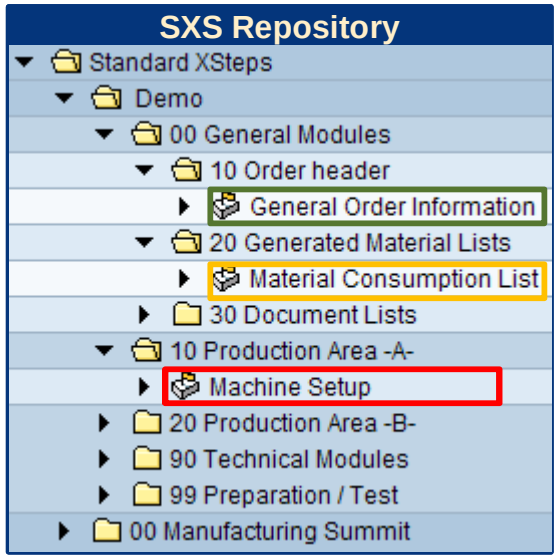


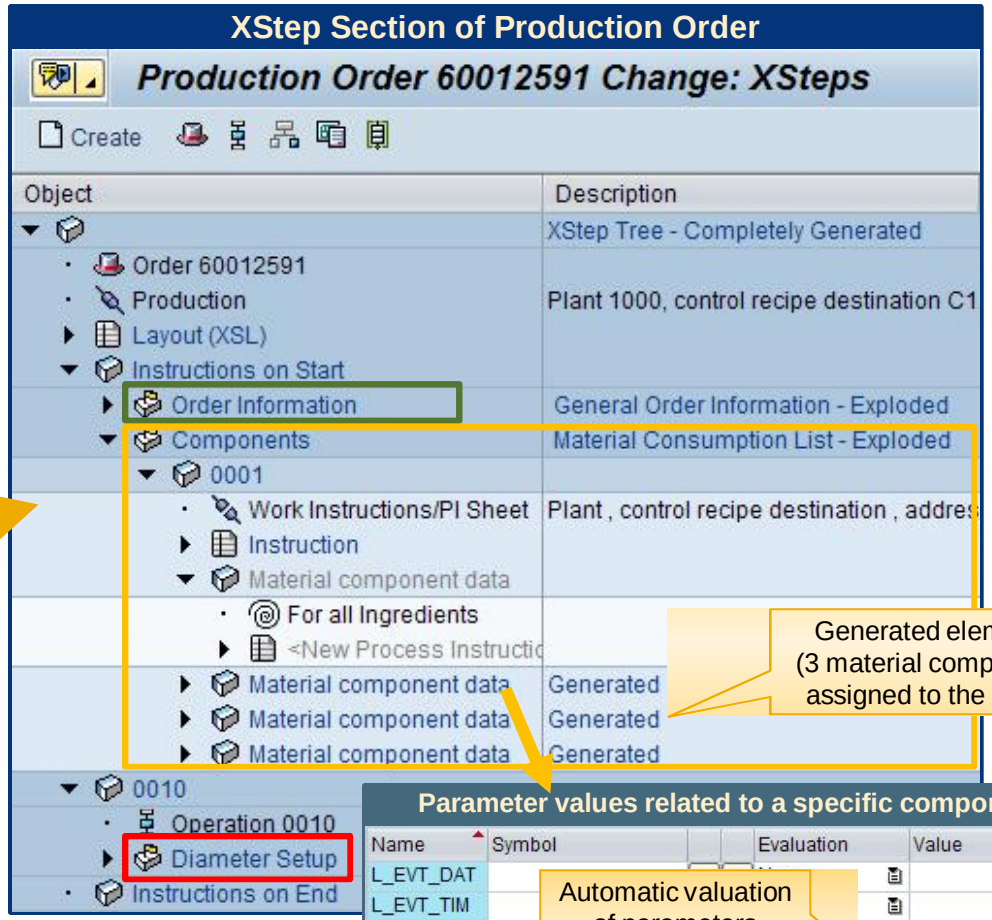


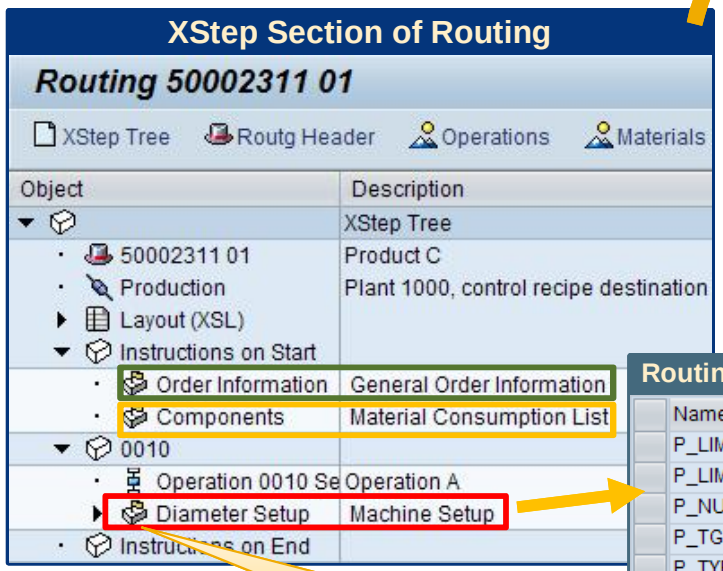


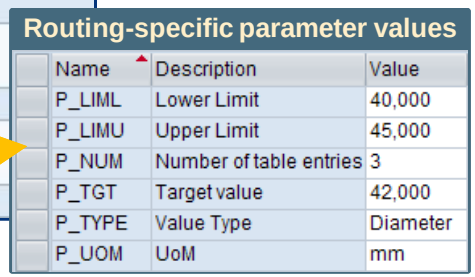


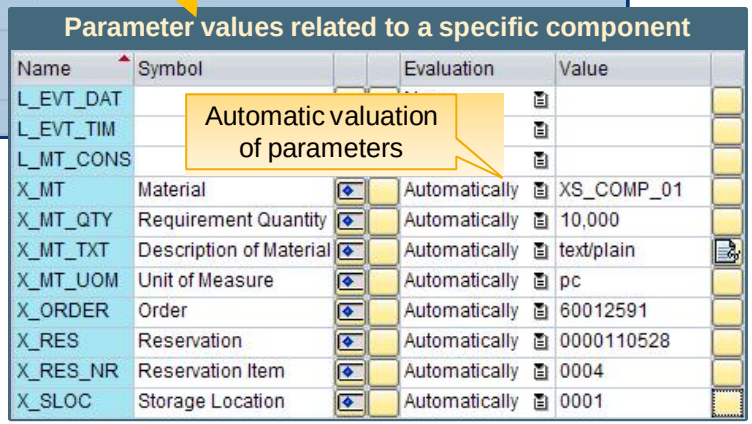
XStep Life Cycle (I)
SXS Repository → Routing/Recipe → Order









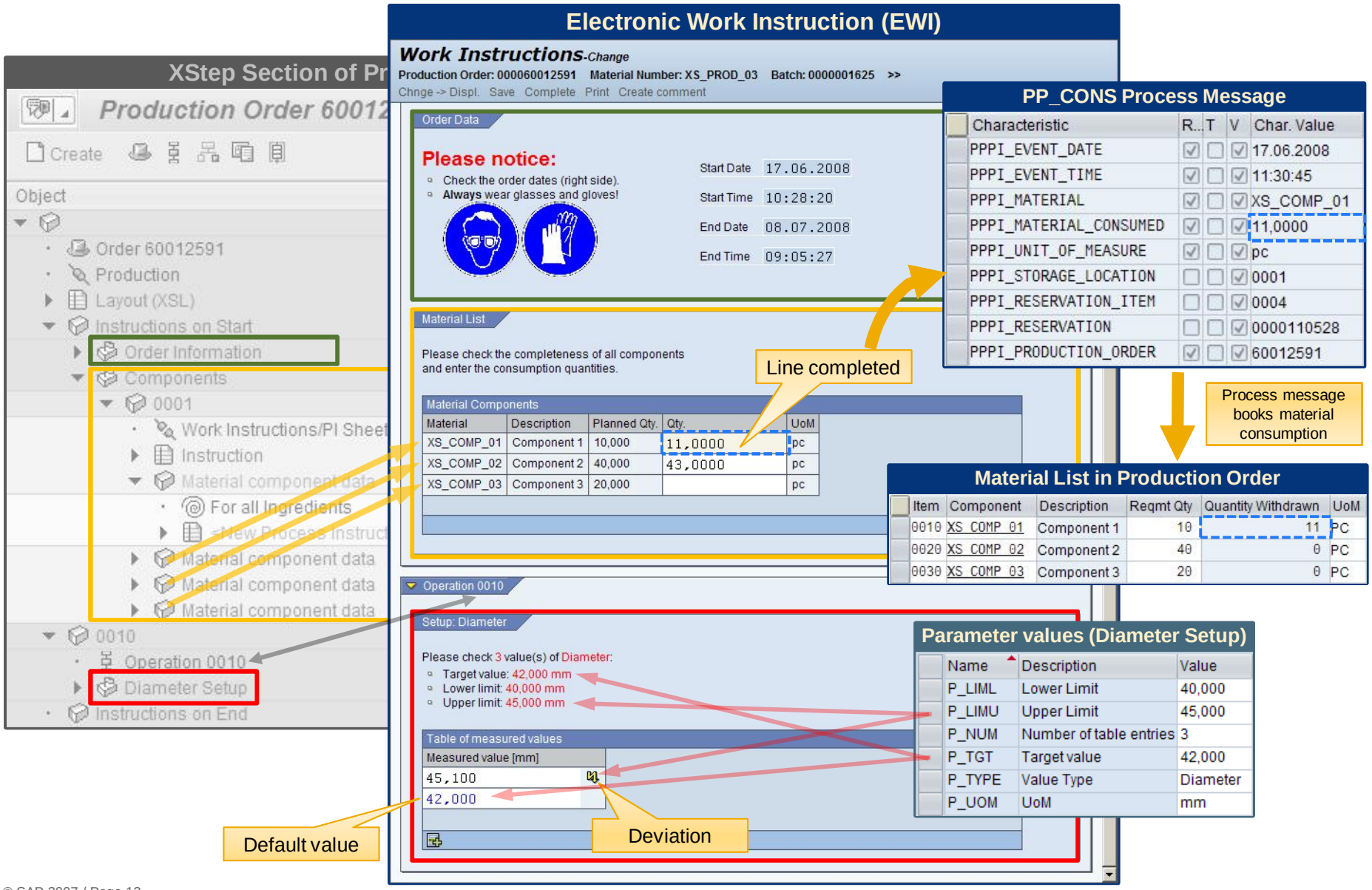


Generated elements (3 material components assigned to the order)

Automatic valuation of parameters

SXS with parameters

XStep Life Cycle (II): Order → EWI/PI Sheet → Process Message



Release History

Release	Business Function	Solution Characteristic	Details
R/3 4.6c	-	HTML-based PI Sheet instructions (Big fonts, images,…)	■ HTML formatting (Big fonts, images,…) ■ Flexible usage of custom function modules ■ New generic process instruction (Type 0)
		Electronic Batch Record (EBR)	
R/3 4.7	-	Adaptiveness by usage of commands and events	
		Easy OPC integration	■ SAP ODA
R/3 4.7 Ext. 2.0	-	XSteps – Easy to reuse building blocks	
ERP 2005 EhP2	LOG_PP_PI_EHM	Process Industry Enhancements: XSteps (regulated environment)	
EhP3	LOG_PP_XS_RTG_PO	XSteps for Routing and PO (Discrete)	
	LOG_PP_PMA_PMC	Misc. PI Sheet enhancements	■ General styleheet enhancements ■ Discarding PI Sheets from process order ■ Mandatory entries by setting in characteristic ■ Improved PARAMETER_CHANGED event ■ New PDF printing function
		Standard XStep Library	■ Collection of Standard XSteps: SDN (→ Downloads → Core Manufacturing)
EhP5 (planned)	LOG_PP_PI_PMA_01	Archiving of PI Sheets and EWI	
	LOG_PP_XS_01	XStep enhancements for globalization	■ Cross-plant repository ■ Language dependency

Summary

PI Sheets / Electronic Work Instructions:

- ‚One-stop shop‘ for the worker to access and provide all ERP-related information. No need to run multiple transactions.
- Flexibility and speed by dynamic and event-triggered instructions
- Control of the material and information flow between ERP and production systems (OPC)

XSteps:

- XSteps are easy to create and maintain. Much of the day-to-day work can be done by functional departments. The IT department can concentrate on more complex areas.
- The repeated use of standard building blocks (SXS) reduces the maintenance effort for the master data definition

Information and XStep examples are available on:

- BPX Community for Manufacturing
- XStep Café

Thank you!

MDA & OPC

Interfaces with factory floor systems: PI-PCS vs. OPC

PI-PCS Interface

- Message based
- Targets fully automated processes without user interaction
- Asynchronous
- Subscription
- Vendors have to implement interface;
  Certification of solutions

SAP OPC Data Access

- Manual or semiautomated processes with user interaction (e.g. PI-sheet)
- Synchronous
- Industry standard is used;
  no certification necessary
- Generic
  (any OPC DA Server)

Both interfaces complement each other !

”OPC is open connectivity via open standards”

Source: OPC Foundation

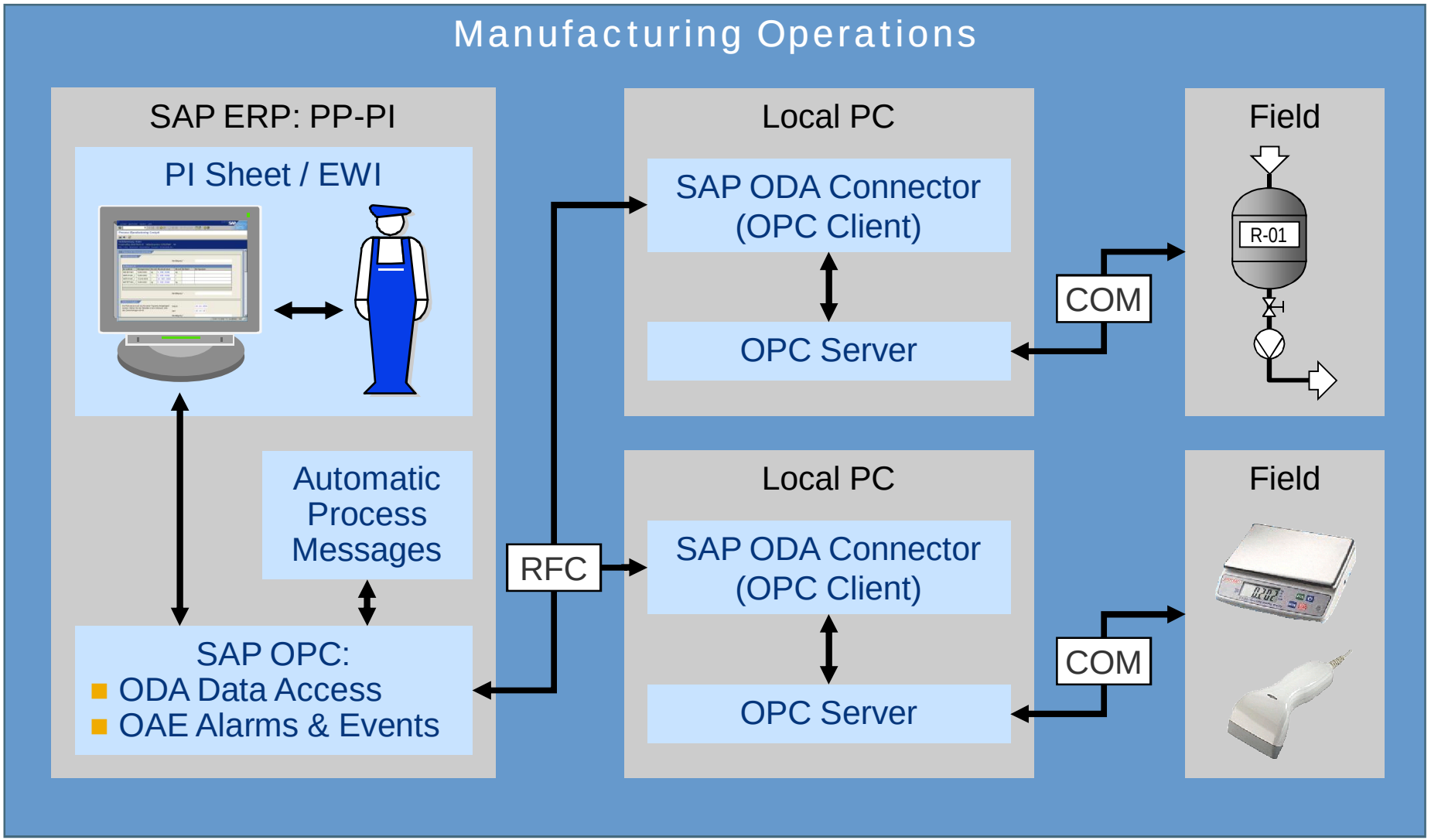
- Non-proprietary Industry-Standard
- Non-profit Organization
- Nearly 400 Members

www.opcfoundation.org

OPC Standards offered by SAP ERP

- ✓ OPC Data Access (OPC DA)
- ✓ OPC Events & Alarms (OPC EA)
- OPC for Batch
- OPC DX
- OPC Data Historian
- OPC XML
- Security

OPC Interface in SAP ERP



Download the SAP ODA Connector:
http://service.sap.com/manufacturing → Downloads → SAP OPC Data Access

EhP2:
Enh. for Regulated Industries

Usage of Standard XSteps in a Regulated Environment

Standard XSteps as Building Blocks for PI Sheets require additional features (regulated environment):

Main features:

- Approval procedure for SXS versions using digital signatures
- Where-used list for SXS
- XML export and import of folders, SXS and SXS versions

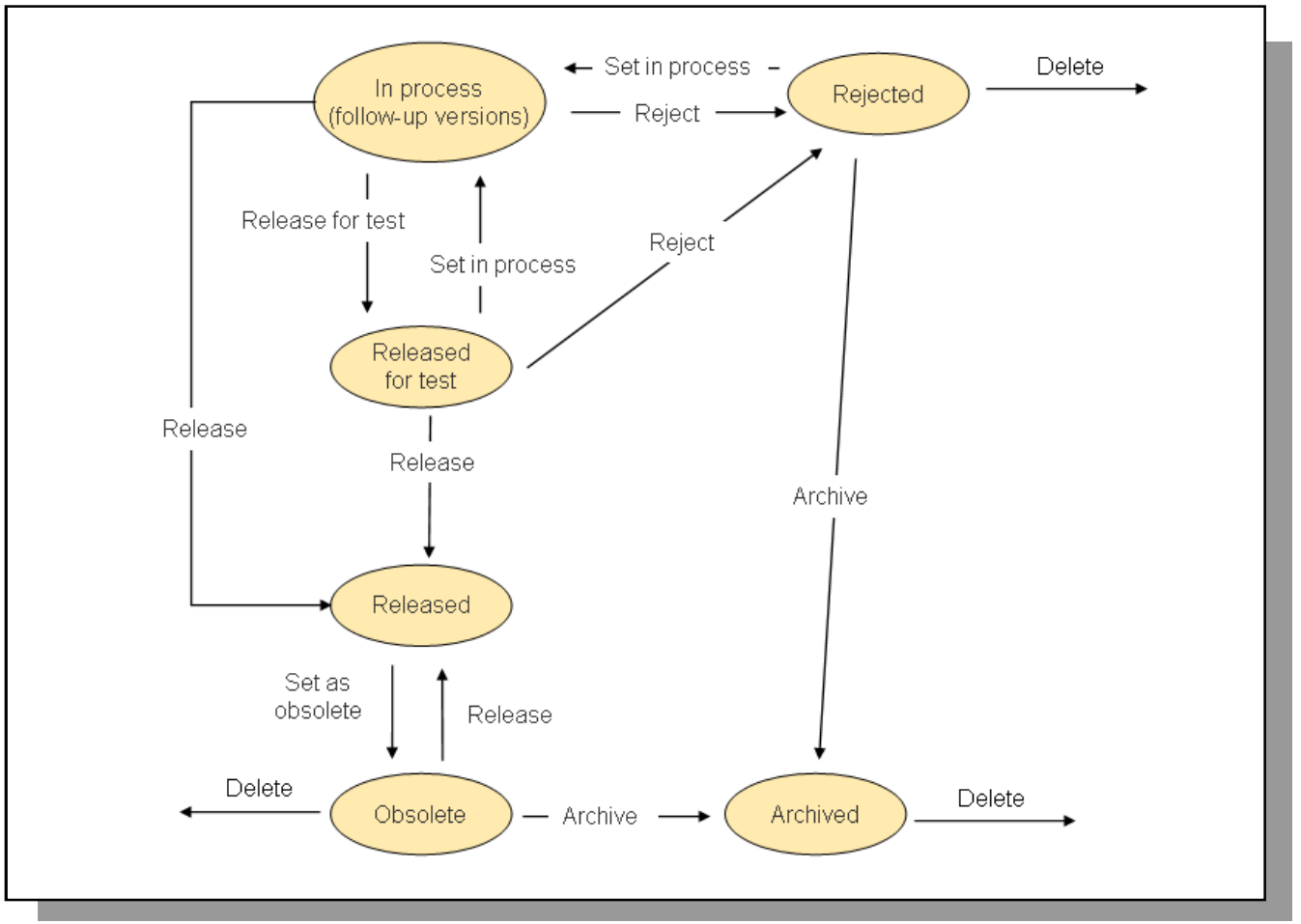
„Nice to have“:

- Checksum test during XML import
- Automatic numbering of SXS version
- Automatic calculation of the valid to-date for released SXS version

Setup: Customizing [CMX21]

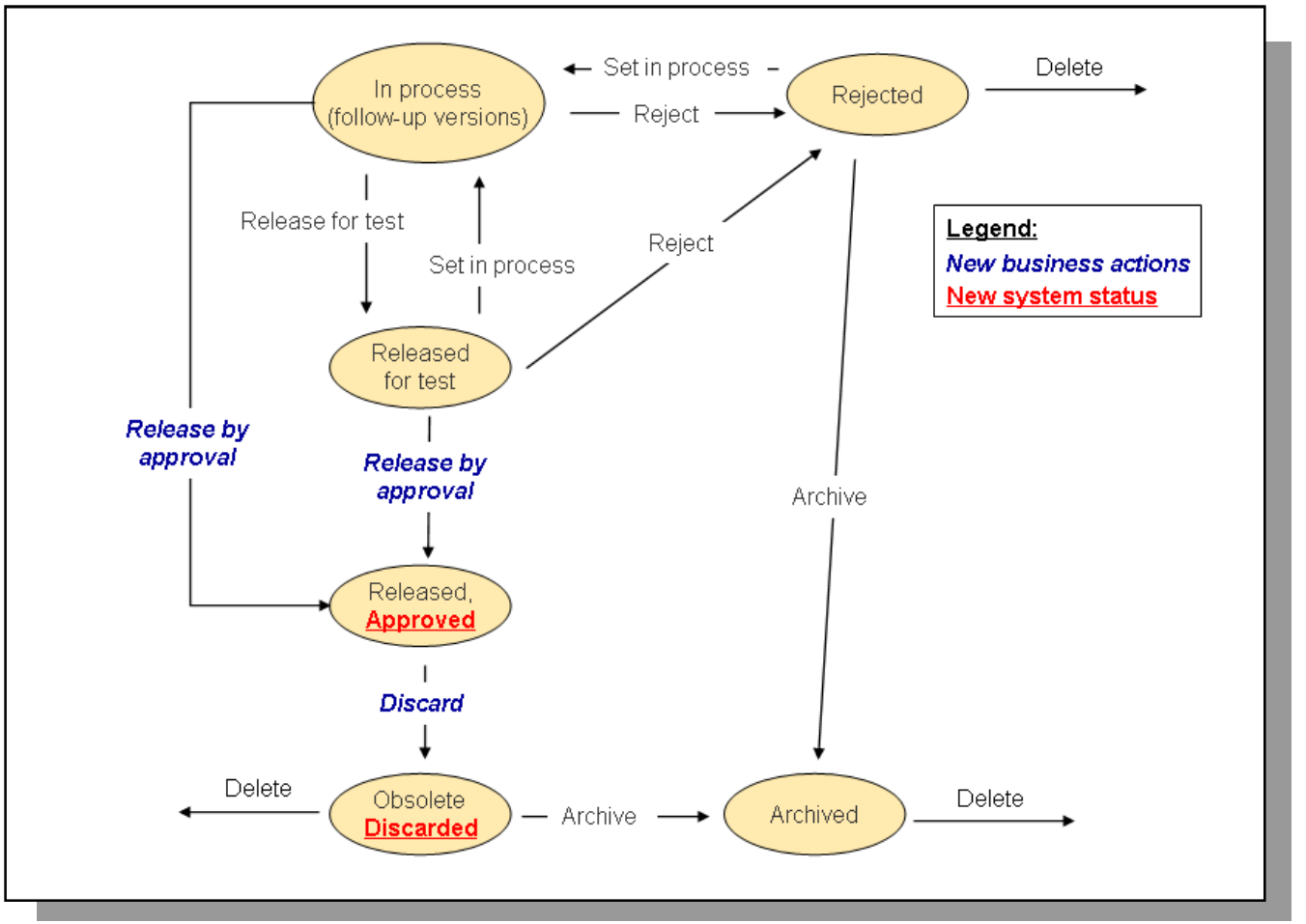
Approval status scheme for SXS versions

Standard scheme for an SXS version

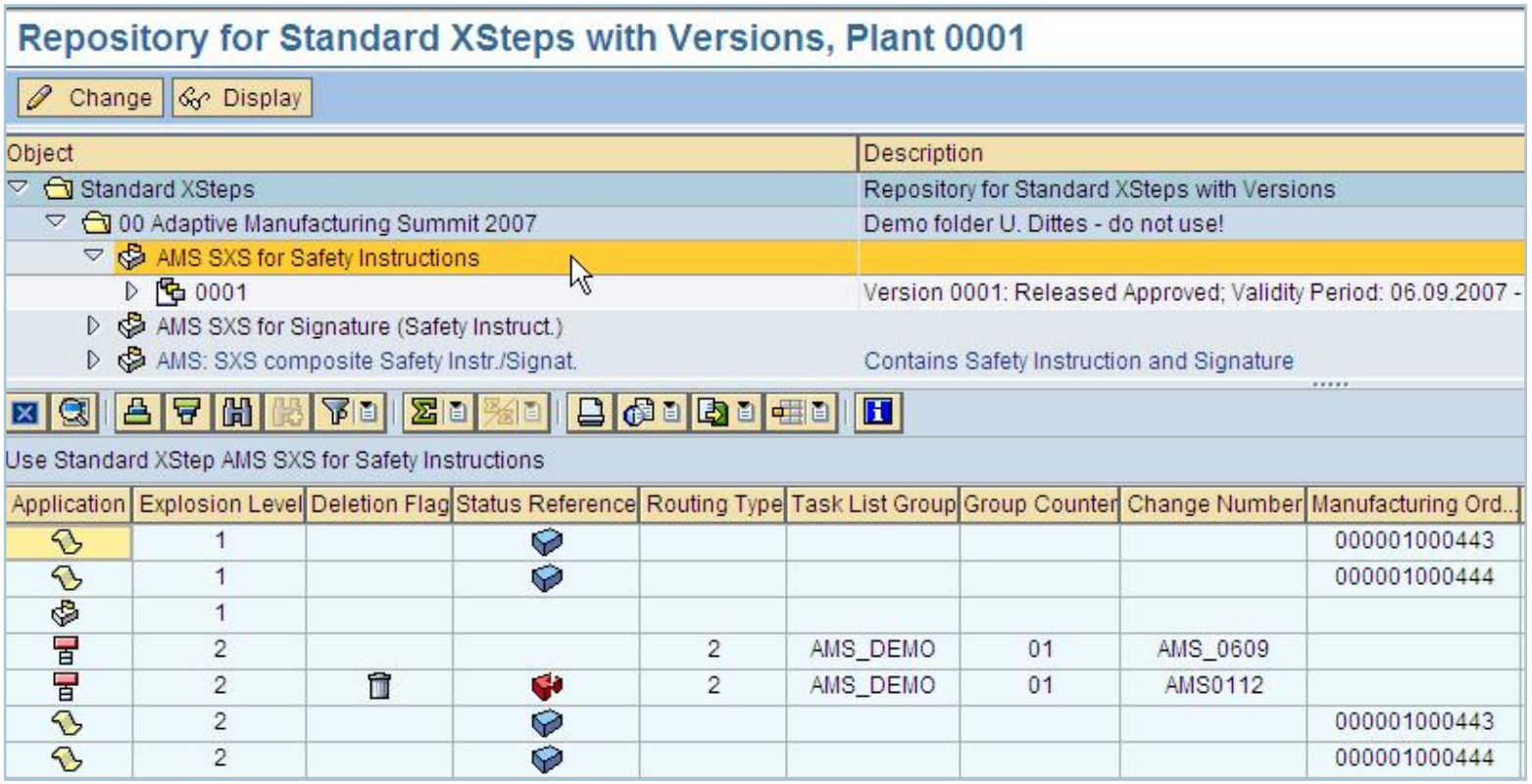


Approval status scheme for SXS versions

Standard scheme for an SXS version with approval (pharma)



Where-used List for Standard XSteps



EhP3:
Misc. Enhancements

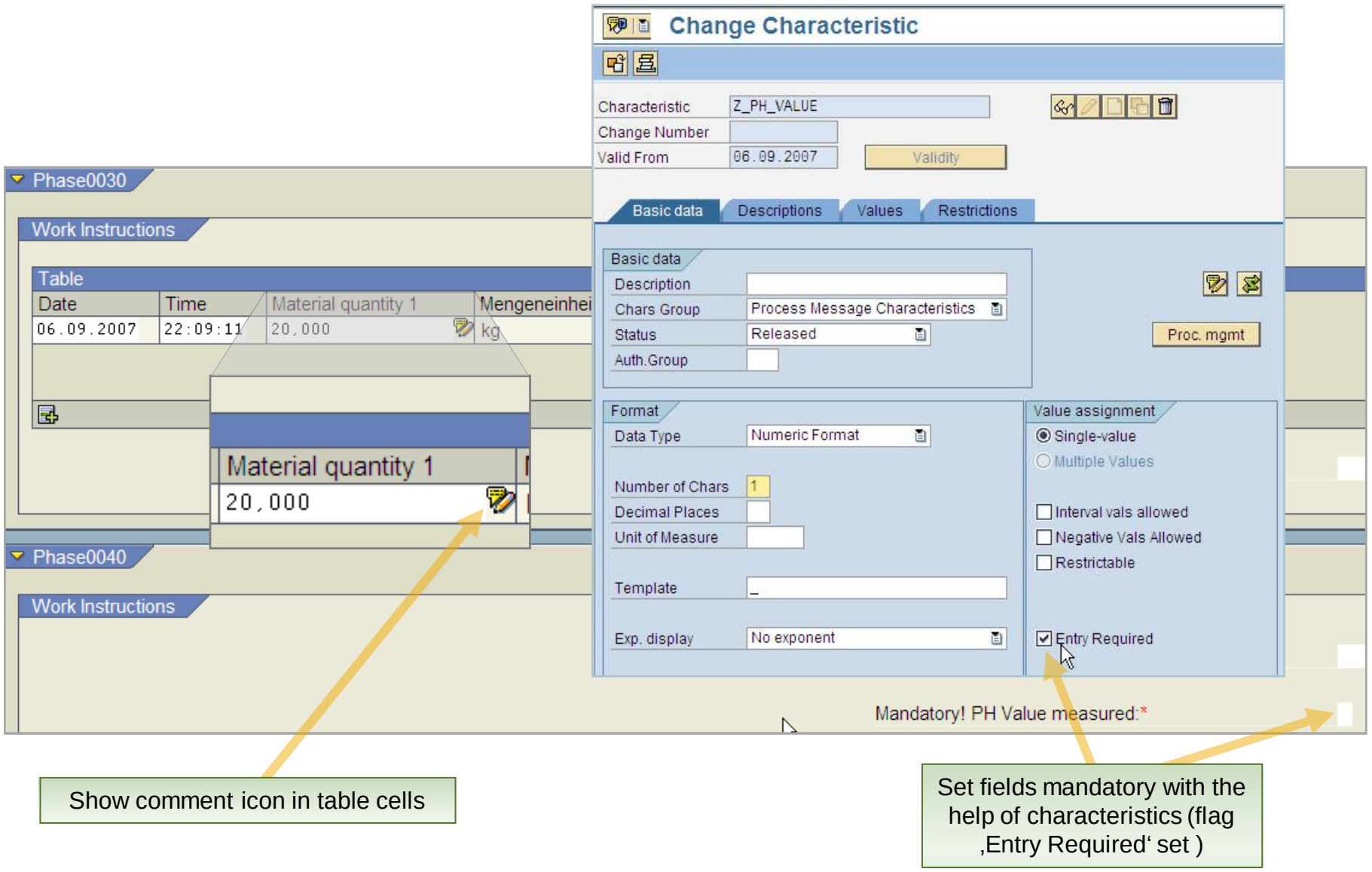
Detail Functions

- General styleheet enhancements
- Discarding PI Sheets from process order
- Mandatory entries by setting in characteristic
- Improved PARAMETER_CHANGED event
- New PDF printing function

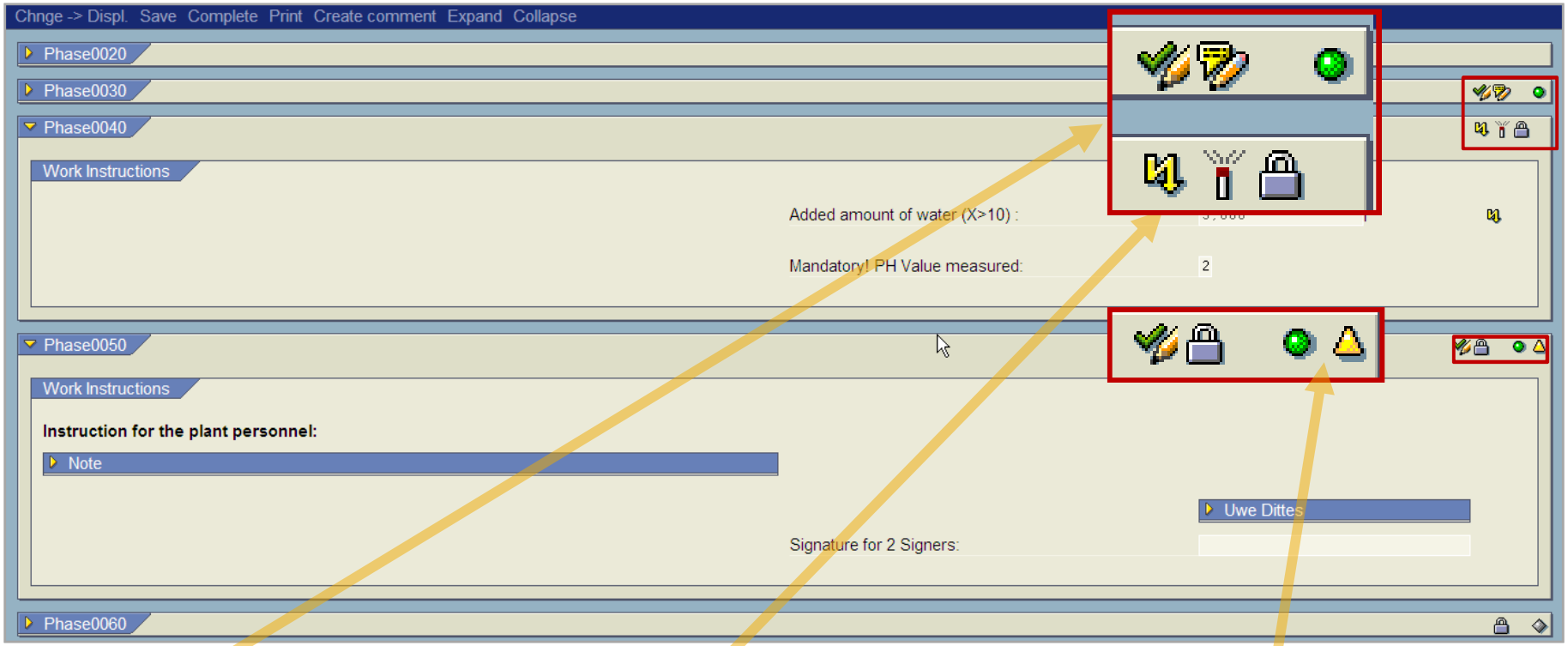
Customizing:
For all functions except discarding PI Sheets from process order

SPRO → PP-PI → Process Management → Control Recipes → Activate Enhancements for PI Sheet

New Features and Functions



Enhanced New SAP Style Sheet



- Icon Deactivated: Phase contains deactivated elements
- Icon Locked: Phase contains locked elements

- Icon for Signatures already done: There are signatures present
- Icon for Deviations: Deviations occurred in the phase
- Icon for Comments: Comments were created for the phase

- LED Green: Signature completed
- LED Yellow: Signature in progress with more than one signer
- LED Grey: Signature present, not started yet
- No LED: No Signature present

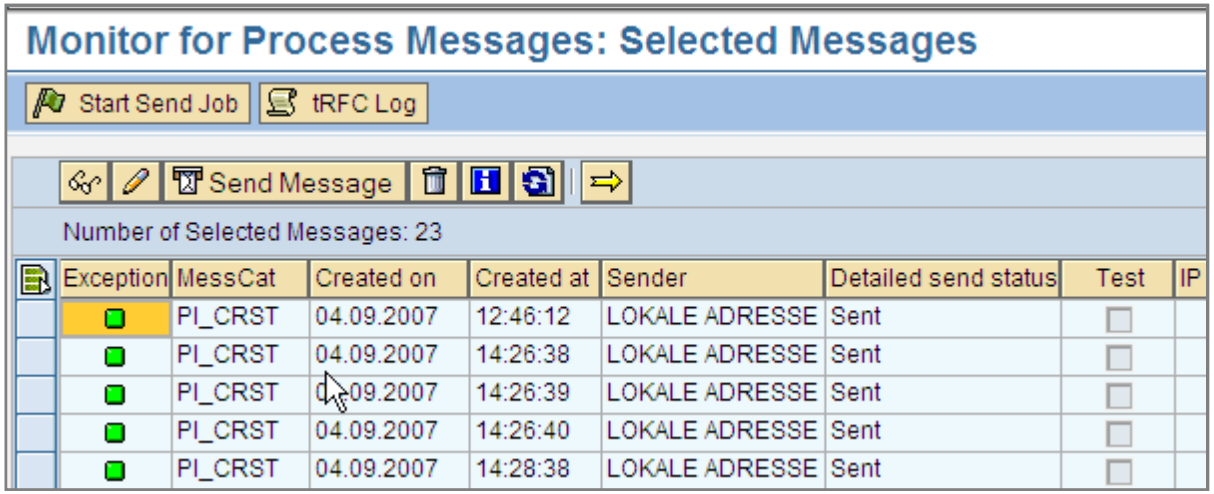
Easy to Adopt – New Monitoring Transactions

New transactions for

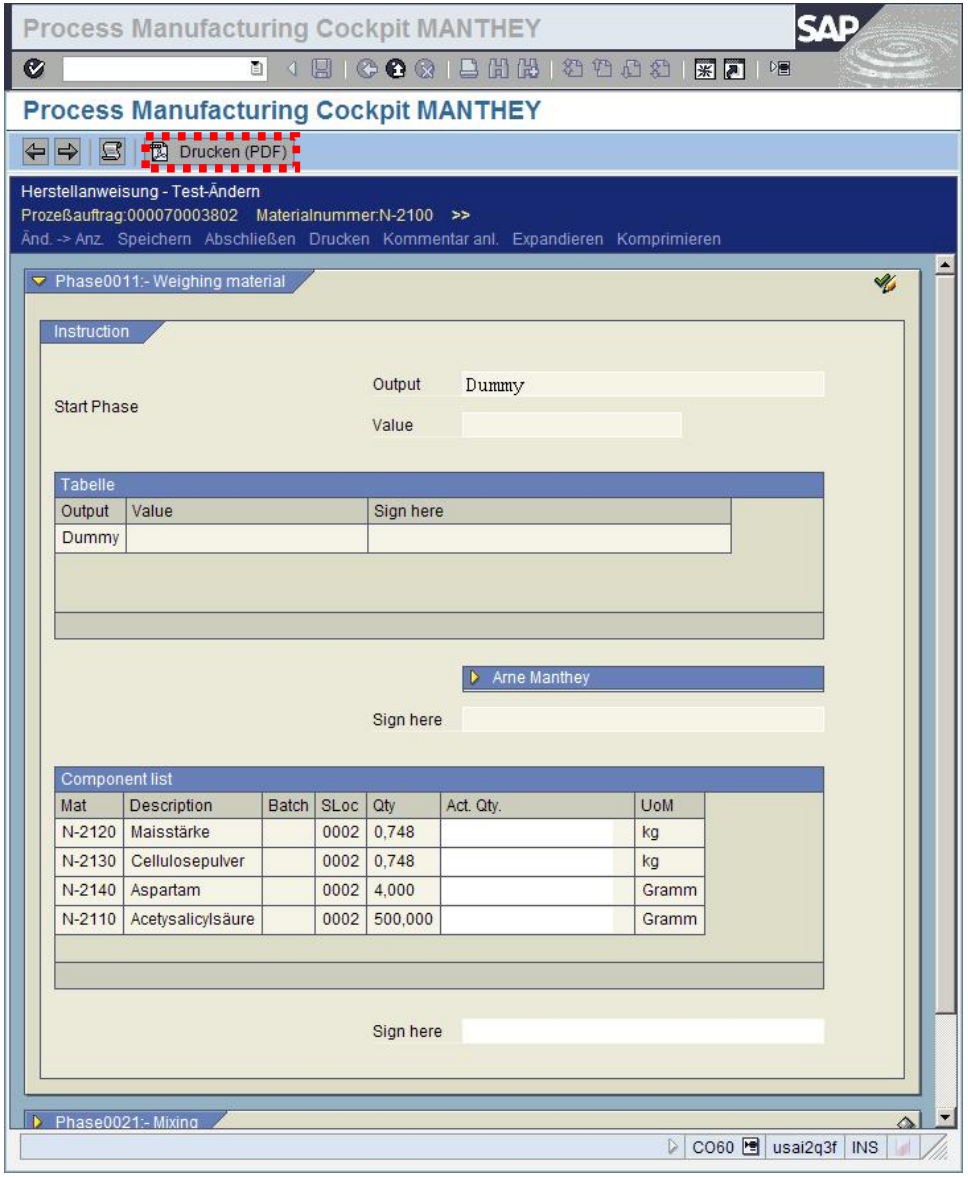
- Control Recipe Monitor (CO53XT)
- Process Message Monitor (CO54XT)
- Work List for PI Sheets/Work Instructions (CO60 & CO60XT)

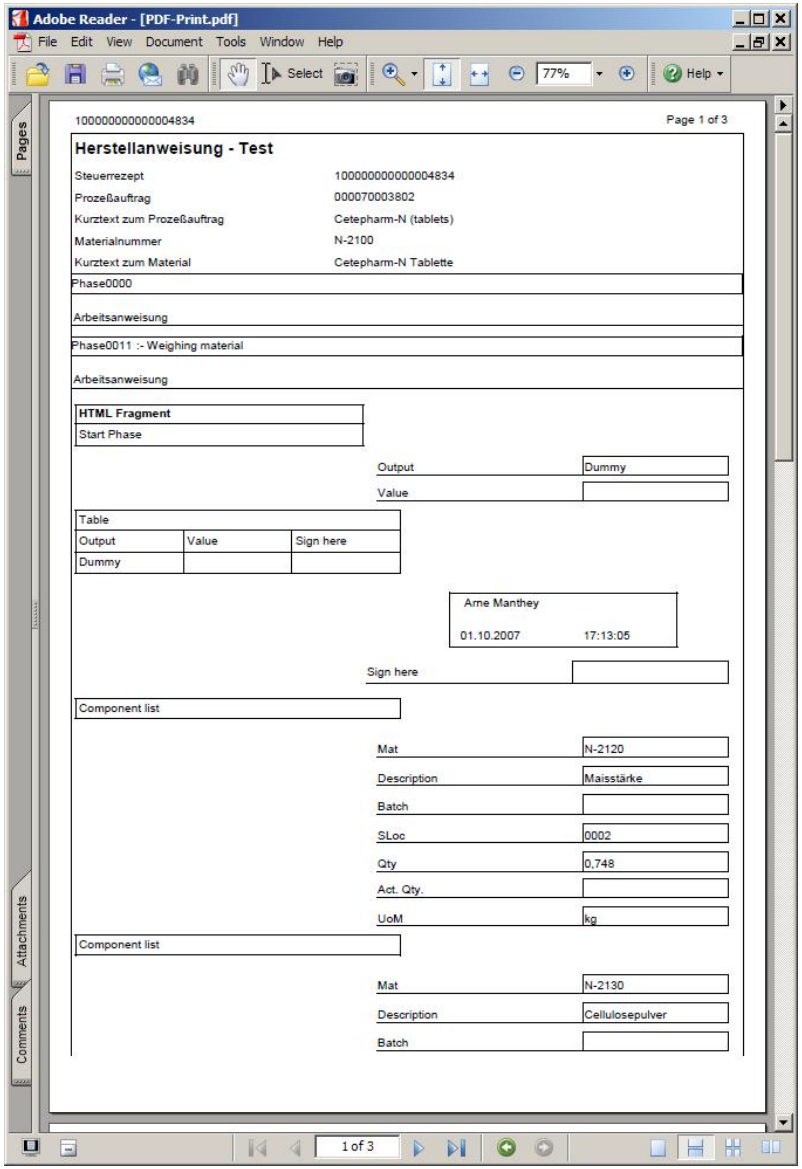
Using configurable ALV_GRID_XT:

- Adding additional columns modification-free (via BAdI implementation and customer-defined append structure)



PDF Print Function





EhP3:
SXS Library

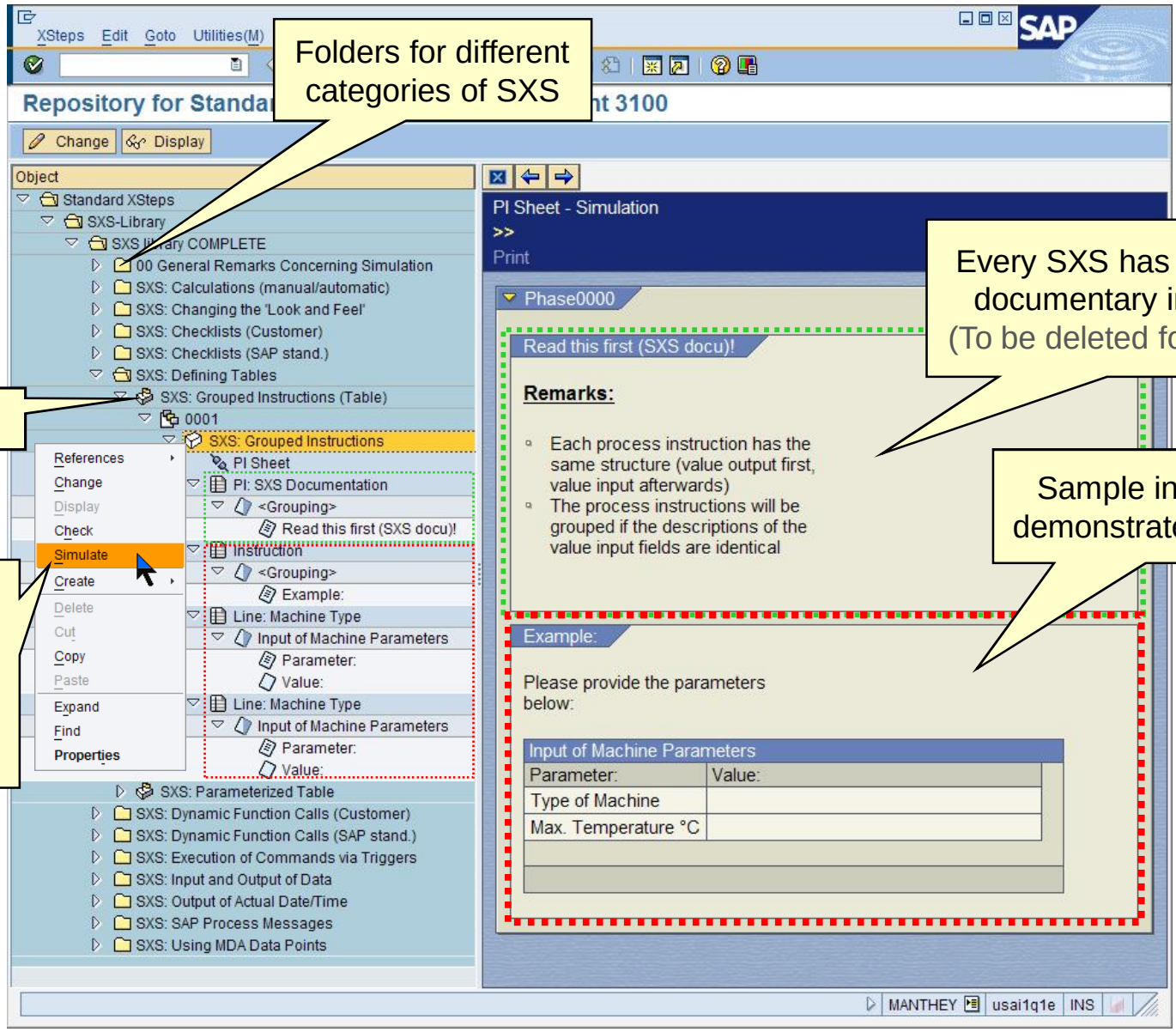
SXS Library: Facts

Purpose
■ Collection of best-practice building blocks
■ Speed-up of implementation

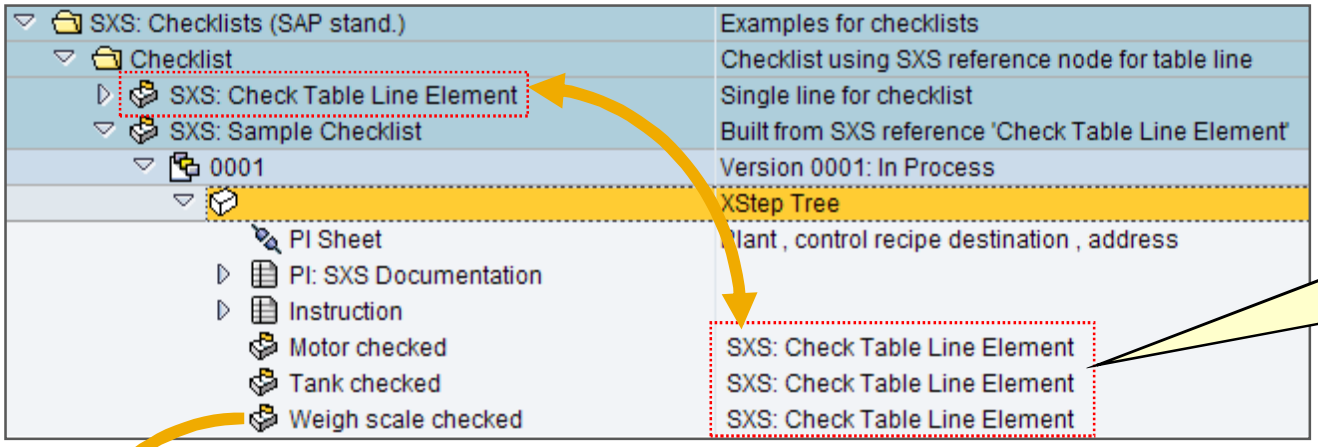
Required Functionality	Release
■ Usage of XStep-based PI Sheets (PP-PI)	**Since R/3 4.70 Ext. 2.0**
■ Importing of XStep folders	**Since ERP 2004**
■ Usage of XSteps for production orders (work instruction sheets)	**ERP 2005 EhP 3**

Content of the SXS Library

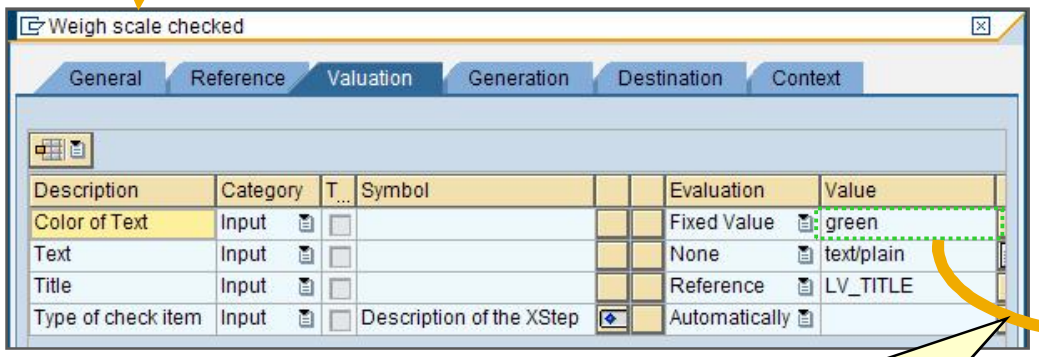
Structure of the SXS Library

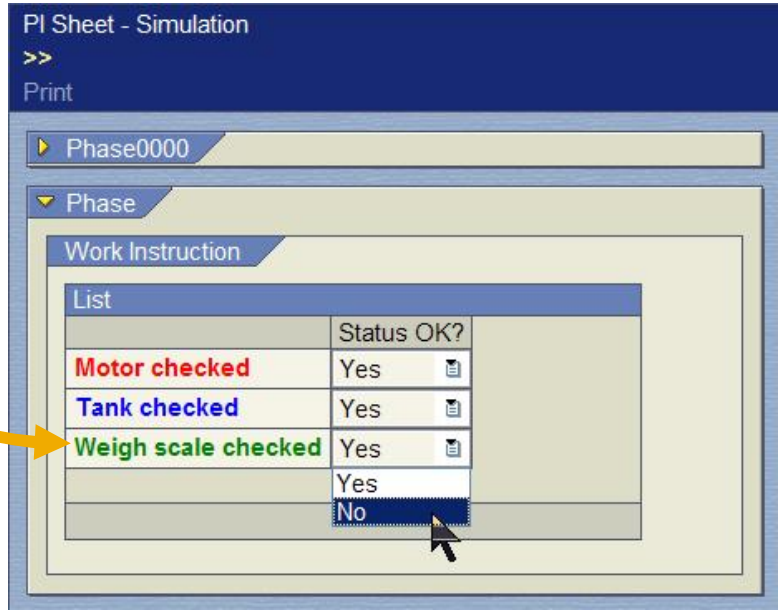


Example: Checklist



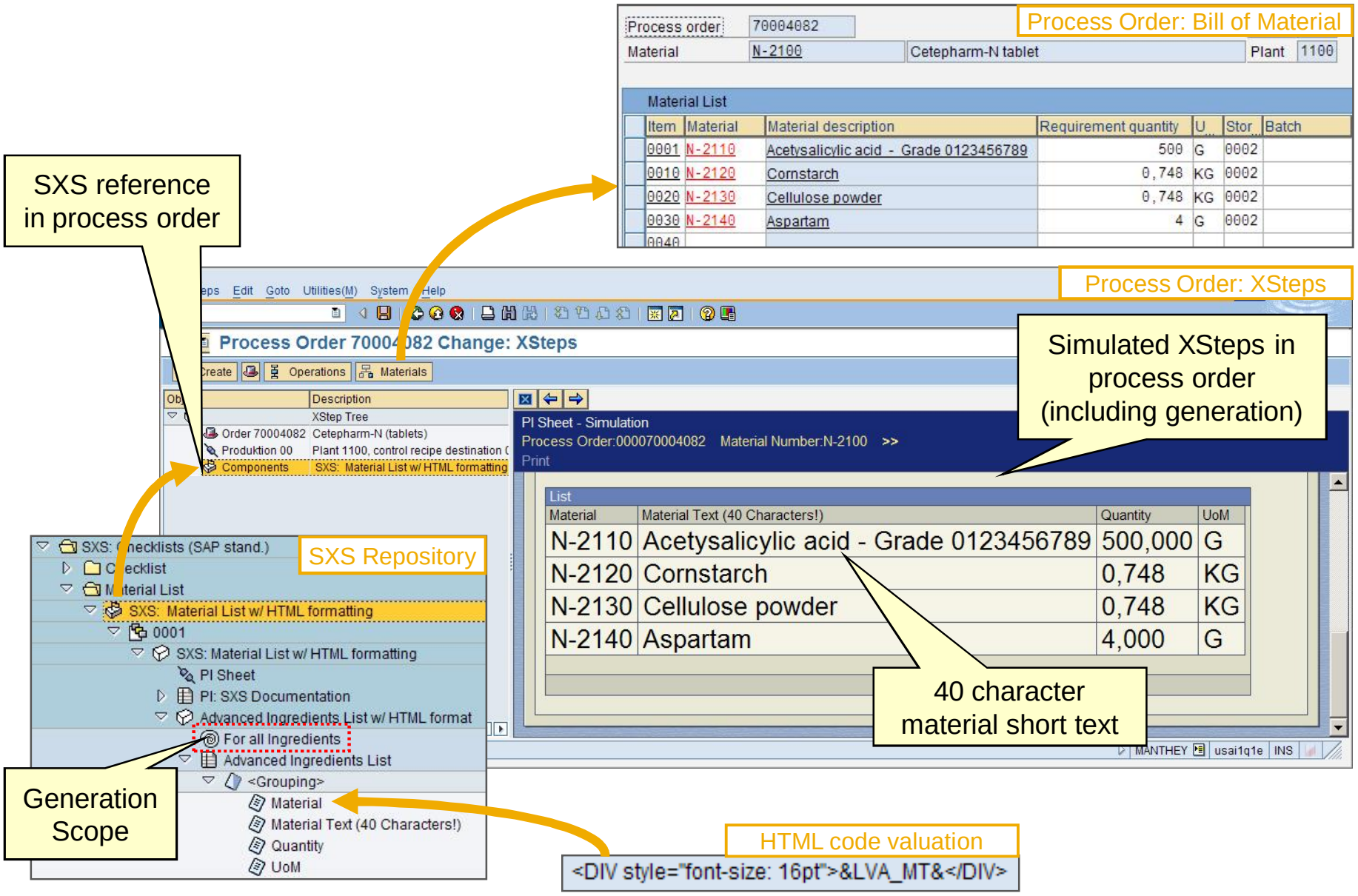
Show the usage of SXS references inside the SXS repository



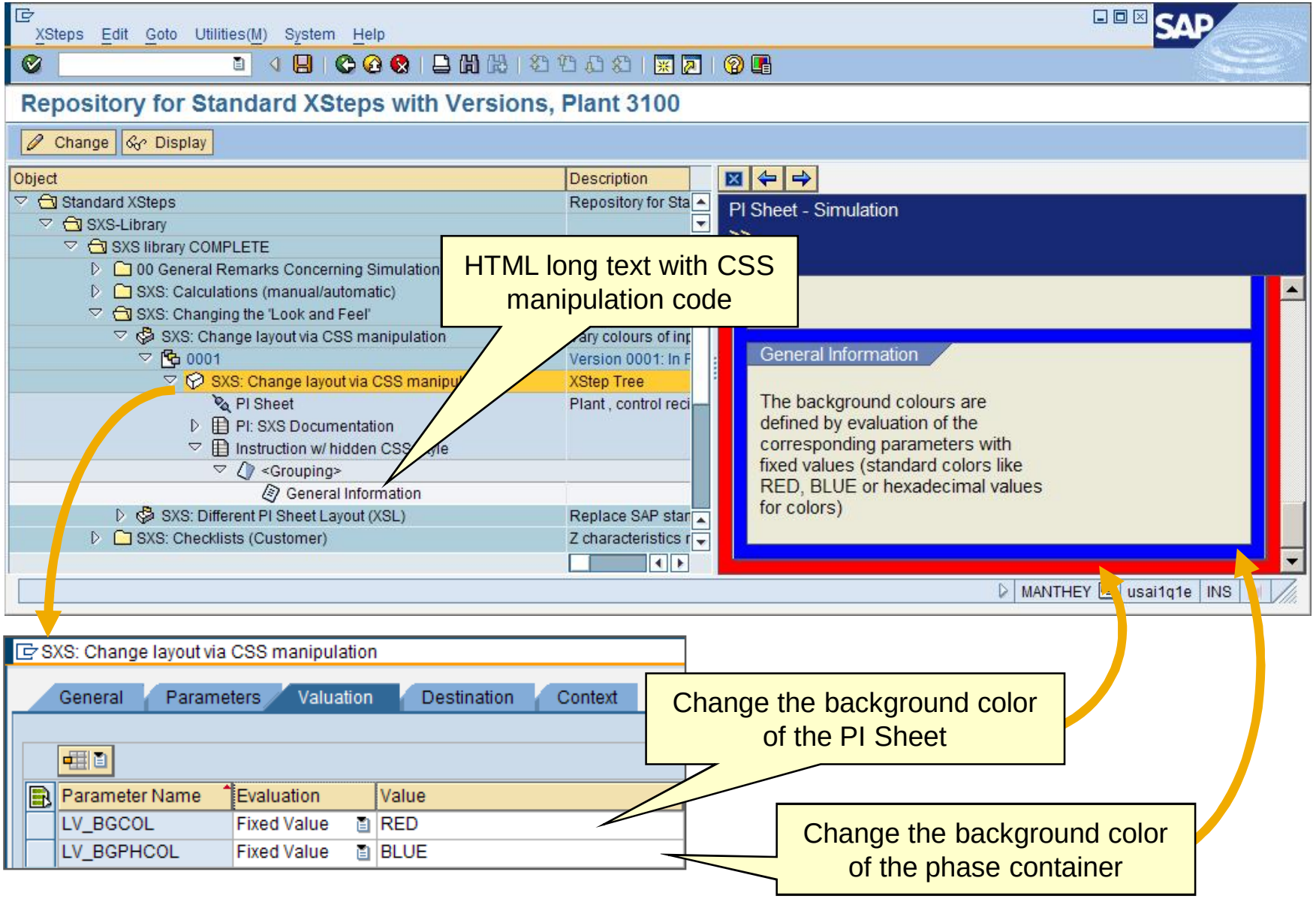


Show how parameters can be used to control the behaviour of an SXS reference (e.g. color)

Example: Material List



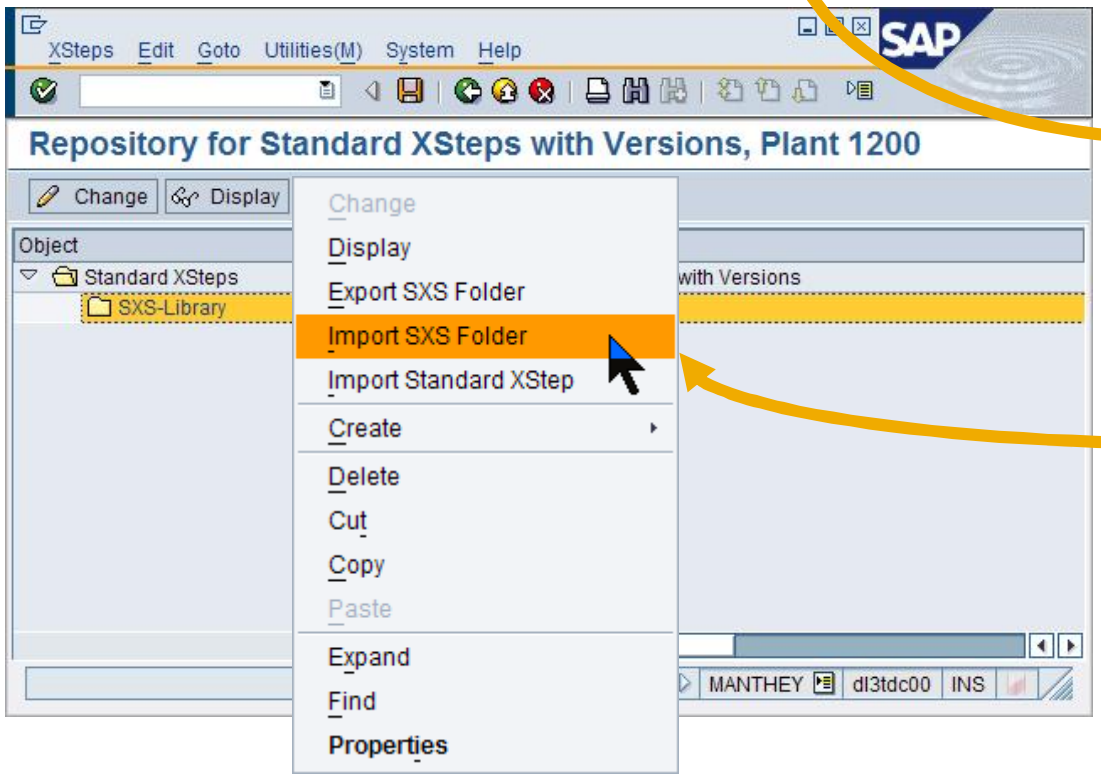
Example: CSS Adoption

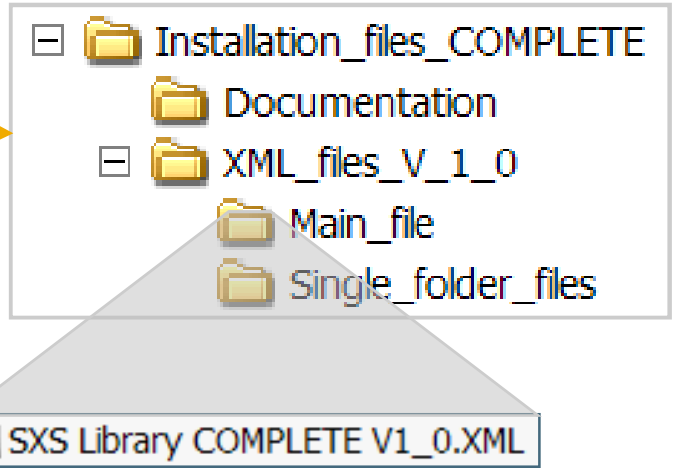


How to get the SXS Library from SDN/BPX

https://www.sdn.sap.com/irj/sdn/bpx-manufacturing → Downloads → Core Manufacturing

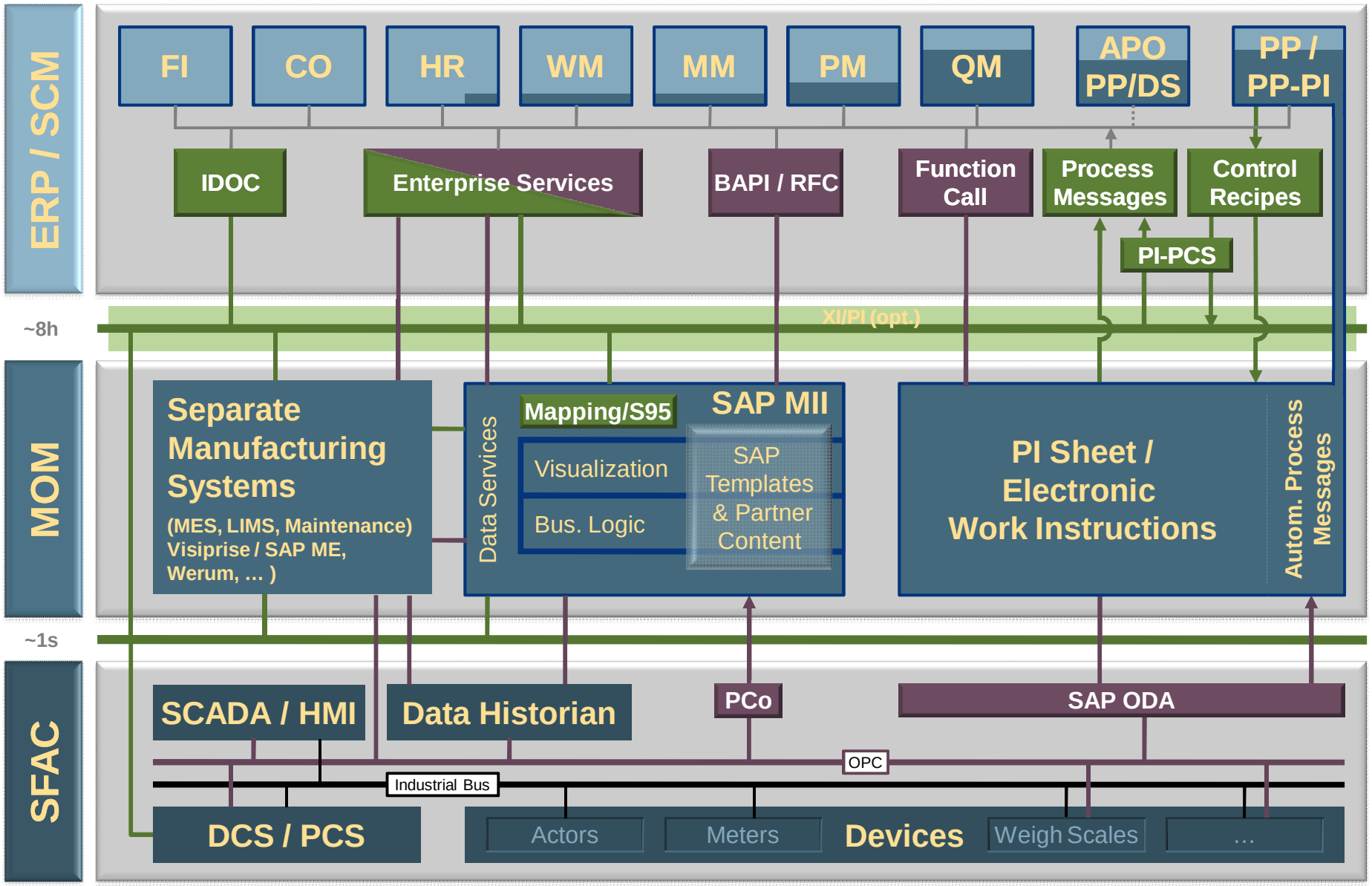
Name of Download Item (ZIP file)	Description
Flexible Building Blocks for Shop Floor Instruction Sheets - Basic Standard XStep Templates	Library of SXS which do **not** use any custom characteristics or function modules
Flexible Building Blocks for Shop Floor Instruction Sheets - Advanced Standard XStep Templates	Library of SXS which use custom characteristics or function modules. (To be created before importing the library)
Flexible Building Blocks for Shop Floor Instruction Sheets - Standard XStep Library	Both basic and advanced libraries



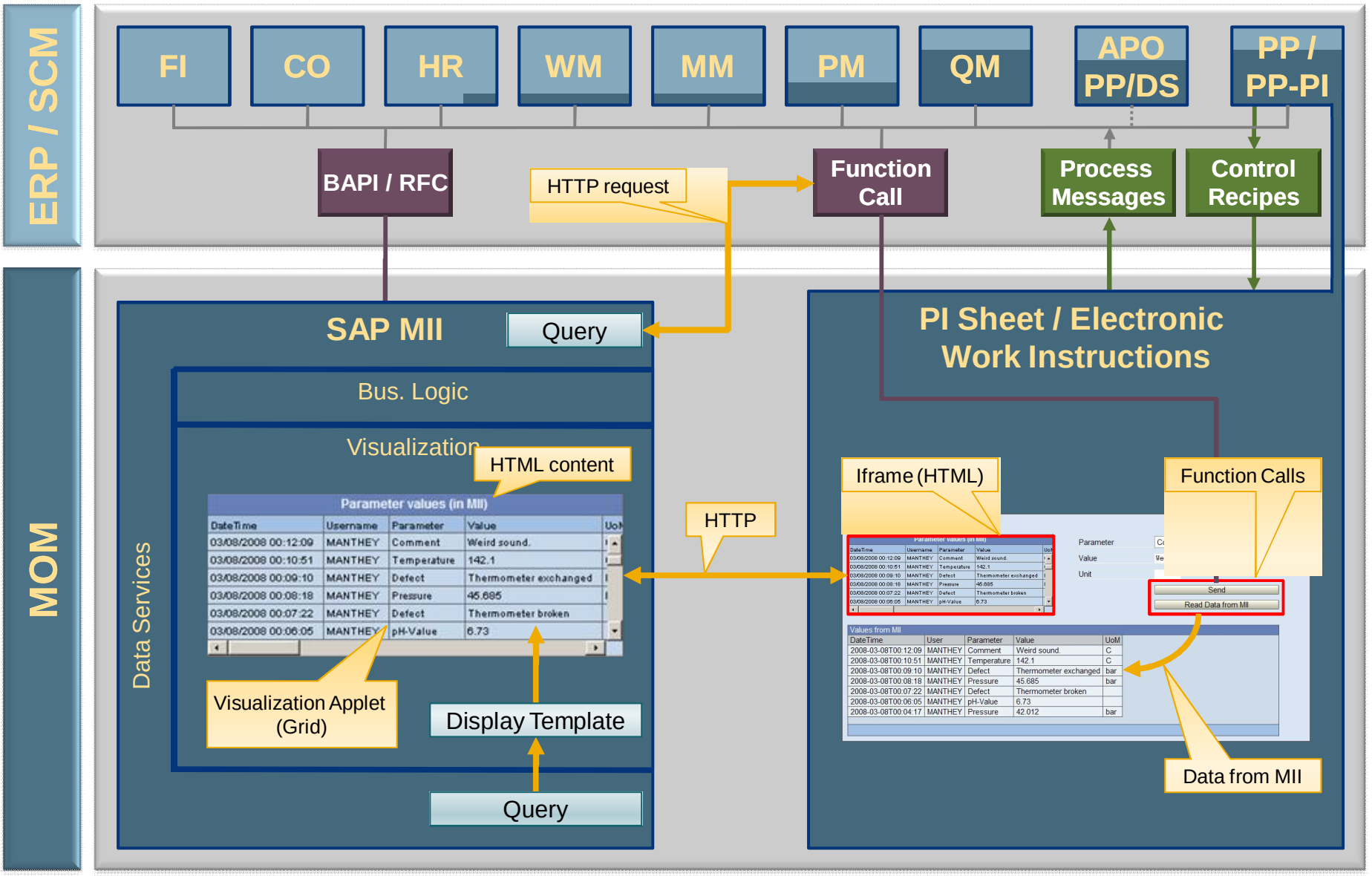


Appendix

Manufacturing Levels and Landscape



Connecting MII and PI Sheet / Electronic Work Instructions



Synchronous Data Transfer

Asynchronous Data Transfer

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